FACSIMILE TRANSMITTAL FORM	Application Number	09/835040
	Filing Date	April 13, 2001
	First Named Inventor	Roberts, Jerry B.
	Art Unit	2674
	Examiner Name	NGUYEN, Kimhung T.
Fax: 703-872-9306	Attorney Docket Number	56700US002
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Date: March 30, 2005	Attorney for Applicant: Robert J. Pechman	

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ENCLOSURES
(check all that apply)

☐ Fee Transmittal Form ☐ Issue Fee Transmittal ☐ Amendment Transmittal	☐ Petition	☐ Appeal Communication to Board of Appeals and Interferences
☒ Amendment/Reply ☐ After Final ☐ Affidavits/Declaration(s)	☐ Petition to Convert a Provisional Application	☐ Appeal Communication to Technology Center (Appeal Notice, Brief, Reply Brief)
☐ Extension of Time Request	☐ Power of Attorney, Revocation	☐ Proprietary Information
☐ Express Abandonment Request	☐ Change of Correspondence Address	☐ Status Letter
☐ Information Disclosure Statement	☐ Terminal Disclaimer	☐ Other Enclosures:
☐ Response to Missing Parts/ Incomplete Application ☐ Response to Missing Parts under 37 CFR § 1.52 or 1.53	☐ Request for Refund ☐ Request for Continued Examination (RCE) Transmittal	
☐ Drawings	☐ After Allowance Communication to Technology Center	

REMARKS: Response to Office Action Mailed January 10, 2005

32692
Customer Number

Patent
Case No.: 56700US002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	ROBERTS, JERRY B.		
Application No.:	09/835040	Group Art Unit:	2674
Filed:	April 13, 2001	Examiner:	NGUYEN, Kimhung T.
Title:	METHOD AND APPARATUS FOR FORCE-BASED TOUCH INPUT		

RESPONSE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF MAILING OR TRANSMISSION [37 CFR § 1.8(a)]
I hereby certify that this correspondence is being:
☐ deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.
☒ transmitted by facsimile on the date shown below to the United States Patent and Trademark Office at (703) 872-9306.

March 30, 2005 — Heather M. Bundy
Date — Signed by: Heather M. Bundy

Dear Sir:

This is in response to the Office Action mailed January 10, 2005. Reconsideration of the application is requested in view of the following remarks.

§ 102 Rejections

Claims 1-16, 18-20, 22-25, 32-35 and 81-85 were rejected under 35 U.S.C. § 102(b) as being anticipated by Frisch (U.S. 5,854,625). Applicant respectfully traverses this rejection.

The claimed invention is directed to a force sensor for sensing a touch force applied to a touch surface. As claimed, the force sensor is a separate subcomponent of a touch sensitive device that is defined without reference to other features of the touch sensitive device. The claimed force sensors include first and second capacitor plates, and an elastic element that includes at least part of the first capacitor plate. In other force sensitive touch devices, including those disclosed by Frisch, the force sensors do not include such integrated elastic elements. Force sensitive touch devices may include a touch surface for receiving a touch input, a frame or substrate that supports the touch surface, and some type of sensor typically positioned between the touch surface and the frame or substrate that senses touch forces applied to the touch surface. Some force sensitive touch devices include a spring or other type of biasing member that helps maintain the touch surface in a rest state relative to the frame or substrate and couples the touch

surface to the frame or substrate. The sensors measure movement of the touch surface against the biasing forces of the spring.

Frisch discloses a variation of commonly known touch sensitive devices. Frisch discloses a touch sensitive device 10 that includes a frame member 12 that supports a top planar member 14. The planar member 14 is configured with a plurality of slots 16 that define a plurality of spring portions 20 and an outer mounting ring 22 spaced peripherally around a touch surface 18. A plurality of capacitors 24 are disposed at the periphery of the touch surface 18 between the top planar member 14 and the frame member 12. The capacitors 24 include a first member 24a disposed on the bottom of the touch surface 18 and a second plate 24b disposed on or integral with the frame member 12. The capacitors 24 function as the "sensors" of the device 10. When a touch force is applied to the touch surface portion 18 of the top or planar member 14, the touch surface 18 moves relative to the frame 12. As the touch surface 18 moves, the distance between the capacitive plates 24a, 24b changes thus creating a change in capacitive value that can be measured and used to determine a location of the touch force applied to the touch surface 18.

The capacitors 24 disclosed by Frisch are flat plates (see Figures 1, 2A and 2B of Frisch). These flat plates have no other structure besides the flat plates shown. Further, the plates 24a, 24b are intended to maintain the same size and shape so as to provide a consistent change in the capacitive value with a change in distance between the two plates. Further, it is clear from Frisch that the touch surface 18, being part of the top planar member 14, is a distinct and separate member from the capacitors 24. Thus, it would be improper to interpret any feature of the top planar member 14, such as a mylar layer applied to the exposed touch surface 18, as being part of the capacitors 24.

Frisch also discloses spring members 20 that perform those functions described above for springs of commonly known touch sensitive devices. The springs 20 allow the touch surface 18 move relative to the frame 12 while helping retain the touch surface 18 in a predetermined rest state/position. The only member or feature of the device 10 disclosed by Frisch that flexes or has any elastic properties relates to the spring members 20 in the connection point of those spring members 20 to the mounting ring 22 and the touch surface 18.

Claims 1, 22, 23, 32 and 34 recite a force sensor for sensing a touch force applied to a touch surface. The claimed force sensor is a separate member or feature from the touch surface to which the touch force is applied. As noted above, Frisch discloses a touch surface 18 and a senor type device (capacitor 24) that senses a touch force applied to the touch surface 18. However, Frisch fails to disclose a first element of the force sensor "including an elastic element and a first capacitor plate having a first capacitive surface, the elasting element including at least part of the first capacitor plate," as required by claim 1. The capacitive plates 24a, 24b disclosed by Frisch do not include an elastic element. The spring members 20 disclosed by Frisch are separate and distinct from the capacitive plates 24a, 24b. Further, the mylar layer (which Applicant does not concede is correctly identified as an elastic member) applied to an exposed outer surface of the touch surface 18 is separated from the capacitive plates 24a, 24b by at least the touch surface 18 itself, which touch surface 18 is also a separate member from the capacitive plates 24a, 24b. Thus, the mylar layer is clearly separate from the capacitor plates 24a, 24b and is not "at least part of" the first capacitor plate, as required by claim 1.

Concerning claim 22, Frisch fails to disclose a first substantially planar element of a force sensor comprising "a first capacitor plate having a first capacitive surface; and an elastic element comprising an integral elevated feature of the first capacitive plate," as required by claim 22. Frisch fails to disclose any type of elastic member or element that is integral with a capacitor plate or that is an elevated feature of a capacitor plate. As discussed above, the touch surface 18 and spring members 20 as well as the mylar layer disclosed by Frisch are all distinct and separate features from the capacitive plates 24a, 24b. Frisch fails to disclose or suggest that any of these features are integral with the capacitive plates 24a, 24b.

Concerning claim 23, Frisch fails to disclose a first element of a force sensor "including an elastic element and a first capacitor plate including a first capacitive surface, the elastic element and the first capacitive surface being substantially coplanar," as required by claim 23. As discussed above, the spring member 20, the touch surface 18, and the mylar layer applied to the touch surface 18 are all separate and distinct features from the capacitive plates 24a, 24b disclosed by Frisch. The features 18, 20 and the mylar layer are also not "coplanar" with any surface of the capacitive members 24a, 24b.

Concerning claim 32, Frisch fails to disclose a force sensor that includes "a first element including a first capacitive plate including a first capacitive surface; a second element including a second capacitive surface, at least a portion of the first element being in contact with at least one support region of the second element to transmit forces thereto," as required by claim 32. The capacitive plates 24a, 24b as disclosed by Frisch are not in contact with each other. In fact, Frisch discloses the need for a capacitive spacing 26 between the plates 24a, 24b to ensure proper capacitive readings for the disclosed device. Frisch further fails to disclose a "second capacitive surface being substantially coplanar with the at least one support region," as required by claim 32. Because Frisch fails to disclose a support region on second capacitive plate or a coplanar arrangement of a support region and a second capacitive surface, Frisch also fails to disclose every limitation of claim 32.

Concerning claim 34, Frisch fails to disclose a force sensor that includes "a first element including a first capacitor plate including a first capacitive surface; a second element including a second capacitor plate . . . at least a portion of the first element being in contact with at least one support region of the second element to transmit force," as required by claim 34. Applicant submits that Frisch fails to disclose this limitation of claim 34 for at least those reasons discussed above related to claim 32.

In view of the above, Applicant submits that Frisch fails to disclose every limitation of independent claims 1, 22, 23, 32 and 34 and the claims that depend from them.

§ 103 Rejections

Claims, 17, 21, 26-31 and 36-41 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Frisch. Applicant respectfully traverses this rejection.

As discussed above, Frisch fails to disclose every limitation of claims 1 and 23. Applicant submits that Frisch also fails to suggest every limitation of claims 1 and 23. Therefore, claims 17, 21 and 26 are allowable for at least the reason they are dependent upon an allowable base claim. Applicant does not concede the correctness of this rejection as it relates to claims 17, 21 and 26.

Independent claims 27, 36, 38, 40 and 41 are directed to force sensors having first and second elements with respective first and second capacitor plates. Each of claims 27, 36, 38, 40 and 41 requires a specific spacing, volume, or size relationship of the first and second capacitor plates (claims 27, 36, 38, 40) or sensor stiffness (claim 41) that contributes to the performance of

the claimed force sensor. These features are relevant as they apply to the accurate assessment of capacitive changes between the capacitive plates when a force is applied. The limitations of claims 27, 36, 38, and 40 result in relatively large surface areas for the capacitive plates as compared to the spacing between the capacitive plates. When one of the two capacitive plates flexes or deforms as it moves toward the other plate, a nonlinear change in capacitance can occur. The larger the ratio between surface area and spacing becomes, the less movement (i.e., deformation) is required between the capacitive plates in order for an accurately measured (i.e., more linear) change in capacitance to occur. As described in the present invention, linearity of response can similarly be controlled by confining the capacitor area to a relatively small central area of the integrated elastic member, making any bending of a capacitor plate within the capacitor area minimal.

Frisch discloses only flat, non-elastic capacitive plates 24a, 24b. As such, Frisch does not recognize the problem related to nonlinear changes in capacitance due to deformation of one or more of the capacitive plate when a touch force is applied to a touch sensor. Frisch further fails to disclose or suggest those limitations of claims 27, 36, 38 and 40 related to capacitive plate spacing, volume, or size and fails to recognize the problem solved by the configurations of claims 27, 36, 38 and 40. Therefore, claims 27-31 and 36-40 are allowable over Frisch.

Concerning claim 41, Frisch fails to disclose a force sensor that includes a first element including an elastic element and a first capacitive plate. As discussed above, the sensor features disclosed by Frisch are limited to the capacitive plates 24a, 24b. The remaining features disclosed by Frisch are features of the touch sensitive device that are not part of the touch sensor. Further, claim 41 is directed to the normal stiffness of the force sensor, which stiffness relates to the easy associated with deforming the features (e.g., the first and second capacitive plates) of the force sensor when a normal force is applied. Frisch fails to disclose sensor features (e.g., capacitive plates 24a, 24b) that can or should be deformed when a touch force is applied to touch surface 18. Therefore, the limitations of claim 41 are neither disclosed or suggested by Frisch as being relevant to the Frisch device, and cannot be obvious in view of Frisch.

In view of the above, Applicant requests reconsideration of the application in the form of a Notice of Allowance. If a phone conference would be helpful in resolving any issues related to this matter please contact Applicant's attorney listed below at 651.371.0631.

It is believed that no fee is due; however, in the event a fee is required, please charge the fee to Deposit Account No. 13-3723.

Respectfully submitted,

March 30, 2005
Date

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